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Mankind's Future*

I believe that man has the power, the intelligence, and the imagination to extricate himself from the serious predicament that now confronts him. The necessary first step toward wise action in the future is to obtain an understanding of the problems that exist. This in turn necessitates an understanding of the relationships between man, his natural environment, and his technology. I hope that this study will in some measure contribute to that understanding.—Dr. Harrison Brown

THE PROBLEM

In principle, the vast knowledge we have accumulated during the last 150 years makes it possible for us to look into the future with considerably more accuracy than could Malthus. But in actual fact we are dealing with an extremely complex problem which cuts across all of our major fields of inquiry and which, because of this, is difficult to unravel in all of its interlocking aspects. The complexity of the problem, our confusion, and our prejudices, have combined to form a dense fog that has obscured the most important features of the problem from our view — a fog which is in certain respects even more dense than that which existed in Malthus's time. As a result, the basic factors that are determining the future are not generally known or appreciated.

In spite of the complexity of the problem which confronts us, its overwhelming importance, both to ourselves and to our descendants, warrants our dissecting it as objectively as possible. In doing so we must put aside our hatreds, desires, and prejudices, and look calmly upon the past and present. If we are successful in lifting ourselves from the morass of irrelevant fact and opinion and in divorcing ourselves from our preconceived ideas, we will be able to see

*Dr. Harrison Brown's recent book, *The Challenge of Man's Future,* makes a notable contribution to understanding the population predicament. Through the generous permission of the publisher and the author, the Bureau is privileged to bring to BULLETIN readers the flavor and versatility of this unique book by extended excerpts rather than by a review. This necessarily omits a good deal of Dr. Brown's masterful discussion of technical details. All readers of the BULLETIN will find this book most stimulating. It is published by the Viking Press, 18 East 48th Street, New York 17, New York. Copyright 1954 by Harrison Brown.—ROBERT C. COOK, Editor.

mankind both in perspective and in relation to his environment. In turn we will be able to appreciate something of the fundamental physical limitations to man's future development and of the hazards which will confront him in the years and centuries ahead.

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Humanity is now experiencing the most rapid transition of its history—a transition that has been far more rapid than that which took place following the introduction of agriculture and the spread of urban civilization. Associated with it have been turmoil and strife, wars and social revolutions. To be sure, the basic causes of war have not changed very much since urban civilization first appeared; they still closely resemble those which brought ancient empires into armed conflict. Wars are still fought to obtain or to keep markets and supplies of raw materials, to spread economic, social, and religious creeds, to pursue power and military security, and to combat threats to power and security. But the techniques of war have changed considerably since the times of the ancient empires, largely as the result of industrialization and expanded technology. In particular, industrialization has led to the development of weapons of progressively greater range and effectiveness, with the result that wars are now much more destructive than they once were.

The development of atomic and hydrogen bombs makes it appear likely that groups of men could, if they wished or were driven to it, annihilate the greater portion of humanity. The fact that this terrible power is now in the hands of men has led many persons to believe that war is the greatest danger that mankind faces during the years ahead—and indeed this belief appears to be well founded. But it is clear that it is by no means the only danger that confronts mankind. Even without it, we are faced with the problems of producing sufficient food, of supplying ourselves with raw materials, and of supplying our machines with energy for the purpose of converting raw materials into finished products. Long-range solution of these problems is imperative if our civilization is to survive. At the same time, war cannot be divorced from these problems; although in the long run failure to solve them would lead to disintegration of Western civilization, failure would also breed war, which in turn would lead to accelerated disintegration.

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The problem of eliminating war and that of eliminating starvation and privation cannot be divorced from each other. We cannot speak in terms of eliminating human misery in the world unless we speak in terms of eliminating war—and conversely, we cannot speak in terms of eliminating war unless we speak in terms of alleviating human misery.

The tensions which exist in the world today are greater than at any previous period of history. . . .

FUTURE PROSPECTS

It is clear that the future course of history will be determined by

the rates at which people breed and die, by the rapidity with which non-renewable resources are consumed, by the extent and speed with which agricultural production can be improved, by the rate at which the underdeveloped areas can industrialize, by the rapidity with which we are able to develop new resources, as well as by the extent to which we succeed in avoiding future wars. All of these factors are interlocked, but in order better to understand the ways in which each of them operates, we must consider them separately.

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In the one-half of the world which is badly undernourished, an increase in food production of approximately 50 per cent is necessary if the people are to have adequate nutrition. Thus, for the world as a whole at the existing population level, an increase in food production of approximately 25 per cent is necessary. But we have seen that in the years to come the population of the world probably will increase considerably above the existing level—possibly reaching 4.8 billion in another 50 years and 6.7 billion in another century. Thus in another 50 years food production might have to be two and one-half times greater than it is today, and by the year 2050, production might have to be multiplied three and one-half times.

* * * *

Thus we see that when we consider population limitation solely on the basis of potential food supply, enormous increases of numbers of human beings are possible in principle. Given adequate raw materials for the production of plant nutrients, the necessary capital with which to undertake major irrigation, land-reclamation, and soil-conservation projects, and capital to construct algae farms and yeast-food plants, a population of several billion persons could clearly be supported at adequate nutritional levels. Indeed, if food habits were to change sufficiently so that the people of the world were content to derive their main nourishment from the products of algae farms and yeast factories, a world population of 50 billion persons could eventually be supported comfortably from the point of view of nutritional requirements.

However, it must be emphasized that an enormous food-production potential is no guarantee against starvation. Throughout most of human history a substantial fraction of the population has existed on a near-starvation diet, and there appears to be little likelihood that starvation can be eliminated in the world for many decades to come. Development of new lands, irrigation, increase of productivity of old land, soil conservation, and the construction of new facilities such as algae farms and yeast factories require enormous expenditures of labor and of manufactured goods. . . . Thus altogether a capital investment of approximately 100 billion dollars would be required to double world food production.

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The underdeveloped areas are in the position, however, of being un-

able to provide new capital at the necessary rate. If left to themselves, they are destined to live at a starvation level for at least another century, and probably for a much longer period of time. . . .

Thus far we have seen that increased food production in the world requires increased industrialization. Increased industrialization in turn requires increased consumption of the earth's resources—coal, oil, iron, phosphate rock, and a variety of other substances. It is important that we now examine the extent to which limitations in the availability of these substances might further affect human development.

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We have seen that in the absence of a world catastrophe it is highly improbable that the "traditional" process of industrialization will ever again be repeated. This process, characterized by growth of the machine network, decreasing mortality, rapid growth of population, expansion of the population into new areas, assimilation of the resources of new areas, and, finally, reduction of birth rates leading eventually to population stabilization, can take place only if there is at the beginning of the process an adequate resource base and a favorable ratio of people to available land. It is a process which one can visualize as having been possible in India had it been started in that country prior to the middle of the nineteenth century. But today—so one-sided has been the application of certain of the benefits of machine civilization — the process would appear to be inapplicable. Successful industrialization and population stabilization in modern India require a drastically new approach.

There are persons who deny this, and say that areas such as India can industrialize successfully without particular attention to contraceptive techniques. This point of view was emphasized recently in a book by Josué de Castro entitled *The Geography of Hunger*, which is a remarkable example of confusion between cause and effect. De Castro points to the fact that areas of low per capita animal-protein intake have high birth rates, while areas of high per capita animal-protein intake have low birth rates. He succumbs to the temptation to conclude emphatically that fertility is primarily a matter of nutrition—if we would but feed the people of the world adequate quantities of animal protein, fertility would decrease, and population stability would be achieved. We need not contradict the thesis here beyond pointing to two facts. First, a similar correlation exists between birth rates and per capita ownership of automobiles. Secondly, perhaps the most rapid rates of population increase in the history of the world occurred in England and in the United States during periods when meat consumption was extraordinarily high. It would be tempting to conclude from these facts that ownership of automobiles rather than animal-protein intake is responsible for the decrease in fertility in the Western World. But of course innumerable

such correlations are possible — plumbing fixtures, radios, motion-picture theaters, miles of railroad track, and availability of newspapers and books. Although it would be pleasant to believe de Castro's thesis, there is not a shred of evidence which indicates that the rate of population growth would be decreased appreciably by providing adequate nutrition.

THREE ALTERNATIVES

If industrial civilization eventually succumbs to the forces that are relentlessly operating to make its position more precarious, the world as a whole will probably revert to an agrarian existence. In such an event history will continue for as long a time as man exists. Empires, republics, and military states will rise and fall. There will be wars, migrations, and revolutions. Art, music, and literature will flourish, wane, then flourish again. As in the histories of the past and of the present, there will be unceasing change. Yet, looked upon over a period of thousands of years, history will have a sameness like the repeated performances of a series of elaborate epic plays in which, over the centuries, the actors change, the languages change, the scenery changes, but the basic plots remain invariant.

But if industrial civilization survives—if wars are eliminated, if the population of the world as a whole is stabilized within a framework of low death rates and low birth rates—will there continue to be a human history? The terms "stability" and "security" imply predictability, sameness, lack of change. And these terms further imply a high degree of organization — universal organization to avoid war, local organization to produce goods efficiently, and organization to control the distribution of goods. Organization in turn implies subjugation of the individual to the state, confinement and regimentation of the activities of the individual for the benefit of society as a whole.

Today we see about us on all sides a steady drift toward increased human organization. Governments are becoming more centralized and universal. In practically all areas of endeavor within industrial society—in our systems of production, in the fields of labor, capital, commerce, agriculture, science, education, and art—we see the emergence of new levels of organization designed to coordinate, integrate, bind, and regulate men's actions. The justifications for this increasing degree of organization to which man must accommodate himself are expressed in terms such as "stability," "security," and "efficiency." The end result of this rapid transition might well be the emergence of a universal, stable, efficient, industrial society within which, although all persons have complete personal security, their actions are completely controlled. Should that time arrive, society will have become static, devoid of movement, fixed and permanent. History will have stopped.

Here we indeed find ourselves on the horns of the dilemma. To what purpose is industrialization if we

end up by replacing rigid confinement of man's actions by nature with rigid confinement of man's actions by man? To what purpose is industrialization if the price we pay for longer life, material possessions, and personal security in regimentation, controlled thoughts, and controlled actions? Would the lives of well-fed, wealthy, but regimented human robots be better than the lives of their malnourished, poverty-stricken ancestors? At least the latter could look forward to the unexpected happening —to events and situations which previously had been outside the realm of their experiences.

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Thus we see that, just as industrial society is fundamentally unstable and subject to reversion to agrarian existence, so within it the conditions which offer individual freedom are unstable in their ability to avoid the conditions which impose rigid organization and totalitarian control. Indeed, when we examine all of the foreseeable difficulties which threaten the survival of industrial civilization, it is difficult to see how the achievement of stability and the maintenance of individual liberty can be made compatible.

The view is widely held in our society that the powers of the machine will eventually free man from the burden of eking out an existence and will provide him with leisure time for the development of his creativity and enjoyment of the fruits of his creative efforts. Pleasant though this prospect may be, it is clear that such a state cannot come into existence automatically; the pressures forcing man into devising more highly organized institutions are too great to permit it. If he is to attain such an idyllic existence for more than a transitory period he must plan for that existence carefully, and in particular he must do everything within his power to reduce the pressures that are forcing him to become more highly organized.

One of the major pressures that give rise to the need for increasing numbers of laws, more elaborate organization, and more centralized government is increase of population. Increase of numbers of people and of population density results in greater complexities in day-to-day living and in decreased opportunities for personal expression concerning the activities of government. But even more important, as populations increase and as they press more heavily upon the available resources there arises the need for increased efficiency, and more elaborate organizations are required to produce sufficient food, to extract the necessary raw materials, and to fabricate and distribute the finished products. In the future we can expect that the greater the population density of an industrial society becomes, the more elaborate will be its organizational structure and the more regimented will be its people.

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Strong arguments can be presented to the effect that collectivization of humanity is inevitable, that the drift toward an ultimate state of automatism cannot be halt-

ed, that existing human values such as freedom, love, and conscience must eventually disappear.[1] Certainly if we used the present trends in industrial society as our major premises, the conclusion would appear to be inescapable. Yet is it not possible that human beings, recognizing this threat to the canons of humanism, can devise ways and means of escaping the danger and at the same time manage to preserve those features of industrial civilization which can contribute to a rich, full life? Is it really axiomatic that the present trends must continue and that in the long run industrial civilization and human values are incompatible? Here, in truth, we are confronted with the gravest and most difficult of all human problems, for it is one that cannot be solved by mathematics or by machines, nor can it even be precisely defined. Solutions, if they exist, can arise only in the hearts and minds of individual men.

NOT BREAD ALONE

The machine has divorced man from the world of nature to which he belongs, and in the process he has lost in large measure the powers of contemplation with which he was endowed. A prerequisite for the preservation of the canons of humanism is a reestablishment of organic roots with our natural environment and, related to it, the evolution of ways of life which encourage contemplation and the search for truth and knowledge. The flower and vegetable garden, green grass, the fireplace, the primeval forest with its wondrous assemblage of living things, the uninhabited hilltop where one can silently look at the stars and wonder —all of these things and many others are necessary for the fulfillment of man's psychological and spiritual needs. To be sure, they are of no "practical value" and are seemingly unrelated to man's pressing need for food and living space. But they are as necessary to the preservation of humanism as food is necessary to the preservation of human life.

I can imagine a world within which machines function solely for man's benefit, turning out those goods which are necessary for his well-being, relieving him of the necessity for heavy physical labor and dull, routine, meaningless activity. The world I imagine is one in which people are well fed, well clothed, and well housed. Man, in this world, lives in balance with his environment, nourished by nature in harmony with the myriads of other life forms that are beneficial to him. He treats his land wisely, halts erosion and over-cropping, and returns all organic waste matter to the soil from which it sprung. He lives efficiently, yet minimizes artificiality. It is not an overcrowded world; people can, if they wish, isolate themselves in the silence of a mountaintop, or they can walk through primeval forests or across wooded plains. In the world of my imagination there is organ-

[1] These views have been forcefully and eloquently expressed by Roderick Seidenberg in his book *Post-Historic Man* (Durham: University of North Carolina Press, 1950).

ization, but it is as decentralized as possible, compatible with the requirements for survival. There is a world government, but it exists solely for the purpose of preventing war and stabilizing population, and its powers are irrevocably restricted. The government exists for man rather than man for the government.

In the world of my imagination the various regions are self-sufficient, and the people are free to govern themselves as they choose and to establish their own cultural patterns. All people have a voice in the government, and individuals can move about when and where they please. It is a world where man's creativity is blended with the creativity of nature, and where a moderate degree of organization is blended with a moderate degree of anarchy.

Is such a world impossible of realization? Perhaps it is, but who among us can really say? At least if we try to create such a world there is a chance that we will succeed. But if we let the present trend continue it is all too clear that we will lose forever those qualities of mind and spirit which distinguish the human being from the automaton.

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In our survey of the situation in which man now finds himself, we see that, although our high-grade resources are disappearing, we can live comfortably on low-grade resources. We see that, although a large fraction of the world's population is starving, all of humanity can, in principle, be nourished adequately. We see that, although world populations are increasing rapidly, those populations can, in principle, be stabilized. Indeed, it is amply clear that, if man wills it, a world community can be created in which human beings can live comfortably and in peace with each other. But it is equally clear that the achievement of this condition will require the application of intelligence, imagination, courage, unselfish help, planning, and prodigious effort. And it is equally clear that the time for decision is the present. With the consumption of each additional barrel of oil and ton of coal, with the addition of each new mouth to be fed, with the loss of each additional inch of topsoil, the situation becomes more inflexible and difficult to resolve. Man is rapidly creating a situation from which he will have increasing difficulty extricating himself.

If man is to find his way successfully through the labyrinth of difficulties that confront him in the years ahead, he must, above all, use his intelligence. He can no longer rely upon the unforeseeable fortunate circumstance; future mistakes will have consequences far more dangerous than past ones have been. He must divorce himself from unreasoned slogans and dogma, from the soothsayer, from the person whose selfish interests compel him to draw false conclusions, from the man who fears truth and knowledge, from the man who prefers indoctrination to education. Man must rapidly accumulate knowledge concerning both his environment and himself, and he must learn how to use that knowledge wisely. He must encourage

the emergence of new ideas in all areas. He must learn not to fear change, for of one thing he can be certain—no matter what happens in the world of the next few decades, change will be the major characteristic. But it is within the range of his ability to choose what the changes will be, and how the resources at his disposal will be used—or abused—in the common victory—or ignominious surrender—of mankind.

THE CRITICAL RESOURCES

We have surveyed briefly the extra-human resources with which he has to work. The values of these are, for all practical purposes, known to science, and they are potentially adequate for a richness of living as yet unexperienced. The unknown values are those of what, in the last analysis, will prove to be the critical resources — those within the mind and spirit of man himself, the "human resources." To what extent can man subjugate selfishness to generosity, ignorance to wisdom, and hate to love? To what extent will he be able to realize in time that if he continues to follow the present path he will soon be confronted by disaster?

We in the United States are in a position of overwhelming responsibility at the present time, for in a very real sense the destiny of humanity depends upon our decisions and upon our actions. We still possess freedom, our resources, and our knowledge, to stimulate the evolution of a world community within which people are well fed and within which they can lead free, abundant, creative lives. Or we can refuse to take constructive action, in which case man will almost certainly start down the steep incline which divides and leads, on the one hand, to the world of robots and, on the other, to that of agrarian slaves. Never before in history has so much responsibility been inherited by a group of human beings. Where in previous times the lives of individual nations and cultures were at stake, today the stake is the destiny of all humanity.

In this time of grave decision, when all the goodness in man must be called forth to subjugate the bad, when our survival depends upon the victory of wisdom and knowledge over stupidity and dogma, we would do well to pay heed to the words of a poet who has expressed the inarticulate thoughts of many of us who look forward hopefully to a more meaningful future for mankind. If the words of Rabindranath Tagore were to become the creed of all men, there would be little doubt that our civilization, and with it our freedom, would survive.

Where the mind is without fear and the head is held high;
Where knowledge is free;
Where the world has not been broken up into fragments by narrow domestic walls;
Where words come out from the depth of truth;
Where tireless striving stretches its arms toward perfection;
Where the clear stream of reason has not lost its way into the dreary desert sand of dead habit;
Where the mind is led forward by thee into ever widening thought and action—
Into that heaven of freedom, my Father, let my country awake.[1]

[1]Rabindranath Tagore, "Gitanjali" (1912).

A Survey of Population Dynamics

It is interesting to compare Dr. Harrison Brown's book with another very important addition to the literature of population emanating from the Population Division of the Department of Social Affairs of the United Nations.*

"Determinants and Consequences" is the product of a cooperative project of distinguished scholars and a supporting cast of advisors. It reviews material from all parts of the world bearing on the population problem, and extends into and beyond the fields of economics, sociology, geography and history. "Wherever possible emphasis has been given to the findings of factual research on each subject, but since such findings are limited both in quantity and scope, other writings, both inferential and hypothetical, have also been included."

The sixteen chapters of the book are divided into three parts: (1) Introduction and Historical Background, (2) Factors Affecting Population Trends, and (3) Economic and Social Effects of Population Changes. Part One traces population growth in the past and the development of population theories. Part Two reviews the economic and social factors affecting mortality, fertility, and migration; dynamics of population growth and age structure; future population trends; and factors affecting population distribution. Part Three treats population as an independent variable, discussing world population and resources; population and labor supply; population and consumption; effects of population growth on per capital output; implications of population trends in highly industrialized countries and in underdeveloped countries; and effects of major migratory movements in modern times.

Demographic knowledge is by no means complete, and less than unanimous agreement exists as to the interpretation of available data. This book represents a gallant effort to present a broad spectrum of theory and doctrine:

> . . . Differences in these interpretations are related to fundamental disagreements between opposing schools of thought with regard to other aspects of economic and sociological theory. In preparing the present summary, an effort has been made to represent impartially the various points of view on such controversial matters.
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> . . . The result reflects the range of material that was available to the Secretariat and to the individuals who collaborated in the preparation of certain chapters. It reflects also the judgment of the authors as to the relevancy of the various studies and findings to the purpose at hand.

Even within these limitations, it will surely be a definitive source book in this field for many years. The bibliography alone covers fifty

**The Determinants and Consequences of Population Trends.* A Summary of the Findings of Studies on the Relationships between Population Changes and Economic and Social Conditions. New York, United Nations, Department of Social Affairs, Population Division, 1953. Pages: xii, 404. $4.00.

pages and includes over 2500 references.

The importance of this book is two-fold: (1) it makes readily available to the serious student of population an enormous background of relevant literature; and (2) it provides policy makers with a summary of basic knowledge now available regarding those factors which influence the trends in mortality, fertility, and migration. By delving into the varied ways that economic and other factors affect population growth, it furthers understanding of their tangled interrelationships. Such an understanding must necessarily precede formation of effective and politically feasible population policies.

The complexity of the problem is hinted in the following paragraphs:

> The question of the economic and social consequences of population changes has a particularly important bearing on national and international policies at the present time, because the rate of population growth in many countries, and indeed in the world as a whole, appears to be more rapid now than it has been at any earlier time. . . .
>
> Some nations, fearful lest the increase in their numbers should thwart their efforts to attain an acceptable standard of living, have adopted a policy of braking the increase by encouraging emigration or the practice of birth control. The implementation of such a policy, if it is to be as effective as possible, requires knowledge of the factors which influence the trends of fertility and the currents of migration, as well as the interacting effects of migration, fertility, and mortality upon population growth. . . .
>
> It is not only in relation to population policies that the subjects treated in the volume have practical importance. Programmes of social and economic development, to be planned in the most effective way, must take into account the present and future needs of the nation for food, housing, schools, agricultural implements, industrial machinery and raw materials, health services, and other requirements. . . .

The reader with a philosophical bent will find much interest in comparing the diverging points of view and emphasis presented in these two books. This reader could find no reference in the United Nations monograph to the atom—either as a source of military power or of industrial energy. Dr. Brown, on the other hand, spells out how man's entry into the atomic age has radically altered several crucial aspects of the population question.

Bulking even larger than the atom in Brown's analysis of the basic determinants is the human mind and spirit—those creators of chain reactions of social and economic change. There the U. N. monograph is also mute. This lacuna is not to be wondered at, for the bureaux and the committees must always play blind with respect to such basic intangibles.

It is unfortunate that this should be so since "the population problem" is unquestionably the most complex predicament that man has created for himself. Perhaps the greatest barrier to progress in this area lies in the very human tendency to look at any situation in oversimple terms of cause and effect. This leads to naive "solutions": a magic pill, the change of a "law"—legislative or economic. Even in-

terplanetary travel has been suggested.

"Solutions," says Dr. Brown, "if they exist, can arise only in the hearts and minds of individual men"—not in symposia or in resolutions adopted by a committee.

R. C.

We wish to acknowledge with thanks Mr. Earl Huyck's cooperation in supplying us with the vital rates for Ceylon used in Figure 3, "The Predicament of Agrarian Countries," in the July 1954 issue of the POPULATION BULLETIN—*Ed.*

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